This listing of claims will replace all prior versions, and listing, of claims in the application.

Claims

1.   (Currently amended) A direction finding system <u>comprising</u> ~~incorporating a plurality of antennas (12) characterised in that the system (10) also includes~~:

   <u>a)</u>   a plurality of antennas;

   ~~a)~~ <u>b)</u>   means for determining individual antenna signal strengths;

   ~~b)~~ <u>c)</u>   combining means ~~(SW2, P2, P3, SW3, 18)~~ for deriving combined antenna signal strengths by forming combinations of first and second antenna signals derived from different antennas ~~(12)~~, wherein the second antenna signals are in two sets with signals in one set having a non-zero phase difference relative to signals the other set; and

   ~~c)~~ <u>d)</u>   means for determining at least one emitter bearing from antenna signal strengths.

2.   (Currently amended) A direction finding system according to Claim 1 ~~characterised in that~~ <u>wherein</u> the means for determining emitter bearing is arranged to derive covariance matrix elements from antenna signal strengths and to determine emitter bearing therefrom.

3.   (Currently amended) A direction finding system according to Claim 1 ~~characterised in that~~ <u>wherein</u> the means for determining emitter bearing is arranged to derive a relationship between antenna signal strengths and emitter bearing and to determine emitter bearing therefrom.

4.   (Currently amended) A direction finding system according to Claim 1 ~~characterised in that~~ <u>wherein</u> the relative phase difference is in the range 30 to 120 degrees, and the means ~~(SW1)~~ for determining individual antenna signal strengths and the combining means ~~(SW2, P2, P3, SW3, 18)~~ are arranged to enable successive signal strengths to be derived in successive steps.

5.   (Currently amended) A direction finding system according to Claim 1 ~~characterised in that~~ wherein the relative phase difference is substantially 90 degrees.

6.   (Currently amended) A direction finding system according to Claim 5 ~~characterised in that~~ wherein the combining means ~~(SW2, P2, P3, SW3, 18)~~ is arranged to combine antenna signals with equal gain magnitude and with equal and unequal phase.

7.   (Currently amended) A direction finding system according to Claim 1 ~~characterised in that~~ wherein the combining means incorporates phase shifting means ~~(P3)~~ switchable into and out of an antenna signal path.

8.   (Currently amended) A direction finding system according to Claim 1 ~~characterised in that~~ wherein the combining means incorporates an adder ~~(18)~~ having two inputs both switchably connected to individual signal paths extending to respective antennas ~~(12)~~.

9.   (Currently amended) A direction finding system according to Claim 1 ~~characterised in that~~ wherein:

   a)   the means for determining individual antenna signal strengths comprises a first multipole switch ~~(SW1)~~ having input poles ~~(b, c, d, e)~~ connected to receive signals from respective antennas ~~(12)~~;

   b)   the combining means ~~(SW2, P2, P3, SW3, 18)~~ incorporates a second multipole switch ~~(SW2)~~ having input poles ~~(b, c, d, e)~~ connected to receive signals from respective antennas ~~(12)~~ and a third multipole switch ~~(SW3)~~ for switching phase shifting means ~~(P3)~~ into and out of an antenna signal path extending via the second multipole switch ~~(SW2)~~; and

   c)   the combining means ~~(SW2, P2, P3, SW3, 18)~~ also incorporates adding means ~~(18)~~ for combining signals, the adding means being arranged to add an antenna signal in a first signal path extending via the first multipole switch ~~(SW1)~~ to another antenna signal in a second signal path extending via the second and third multipole switches ~~(SW2, SW3)~~.

10. (Currently amended) A method of direction finding using a plurality of antennas ~~(12)~~ ~~characteriseed in that the method incorporates~~ comprising the steps of determining:

a) individual antenna signal strengths;

b) combined antenna signal strengths by forming combinations of first and second antenna signals derived from different antennas ~~(12)~~, wherein the second antenna signals are in two sets with signals in one set having a non-zero phase difference relative to signals the other set; and

c) at least one emitter bearing from antenna signal strengths.

11. (Currently amended) A method according to Claim 10 ~~characterised in that~~ wherein the step of determining emitter bearing is implemented by deriving covariance matrix elements from antenna signal strengths and determining emitter bearing therefrom.

12. (Currently amended) A method according to Claim 10 ~~characterised in that~~ wherein the step of determining emitter bearing is implemented by deriving a relationship between antenna signal strengths and emitter bearing and determining emitter bearing therefrom.

13. (Currently amended) A method according to Claim 10 ~~characterized in that~~ wherein the relative phase difference is in the range 30 to 120 degrees and successive signal strengths are determined in successive steps.

14. (Currently amended) A method according to Claim 13 ~~characterized in that~~ wherein the relative phase difference is substantially 90 degrees.

15. (Currently amended) A method according to Claim 10 ~~characterised in that~~ wherein the step of forming combined antenna signal strengths combines antenna signals with equal gain magnitude and with equal and unequal phase.

16. (Currently amended) A method according to Claim 12 ~~characterized in that~~ wherein the step of forming combined antenna signal strengths includes switching a phase ~~shifting means (P3)~~ shift into and out of an antenna signal path.

6

17.	(Currently amended) A method according to Claim 12 ~~characterised in that~~ <u>wherein</u> the step of forming combined antenna signal strengths includes adding signals in signal paths extending switchably to different antennas ~~(12)~~.

18.	(Currently amended) A method according to Claim 10 ~~characterised in that~~ <u>wherein</u>:
a)	the step of determining individual antenna signal strengths comprises switching signals from antennas ~~(12)~~ via a first path; <u>and</u>
b)	the step of forming combined antenna signal strengths incorporates:
i)	switching signals from antennas ~~(12)~~ via a first path for combining;
ii)	switching signals from antennas ~~(12)~~ via a switch selectable second path or a third path for combining, the third path being arranged to phase shift antenna signals therein relative to antenna signals in the second path; and
iii)	adding a first path antenna signal to second and third path antenna signals individually.

19.	(New) A method according to Claim 11 wherein:
a)	the step of determining individual antenna signal strengths comprises switching signals from antennas via a first path; and
b)	the step of forming combined antenna signal strengths incorporates:
i)	switching signals from antennas via a first path for combining;
ii)	switching signals from antennas via a switch selectable second path or a third path for combining, the third path being arranged to phase shift antenna signals therein relative to antenna signals in the second path; and
iii)	adding a first path antenna signal to second and third path antenna signals individually.

20.	(New) A direction finding system incorporating:
a)	a plurality of antennas;
b)	measuring apparatus for determining individual antenna signal strengths;
c)	a combining circuit for deriving combined antenna signal strengths by forming combinations of first and second antenna signals derived from different antennas,

7

wherein the second antenna signals are in two sets with signals in one set having a non-zero phase difference relative to signals the other set; and

d) digital signal processing apparatus for determining at least one emitter bearing from antenna signal strengths.